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PATENT APPLICATION
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Sir:

Transmitted herewith for filing is the patent application of Inventor(s):
John Van Wiemeersch; Mark Porter; Lisa Boran; David Symanow

For: **REMOTE CONTROL SYSTEM FOR OPERATING SELECTED FUNCTIONS OF A VEHICLE**

Enclosed are:

- ☒ 2 sheet(s) of drawings
- ☒ Assignment and Cover Sheet
- ☒ Information Disclosure Statement, PTO Form 1449, and Copies of Citations
- ☐ A certified copy of



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Jennifer M. Stec
Attorney or Agent of Record
Registration No. 35,379
Ford Global Technologies, Inc.
One Parklane Blvd.,
600 Parklane Towers East
Dearborn, MI 48126

REMOTE CONTROL SYSTEM FOR OPERATING SELECTED FUNCTIONS OF A VEHICLE

Technical Field

The present invention relates generally to a
5 remote control system for operating selected functions
of a vehicle, and more particularly to a remote
control system having a transmitter mounted on the
vehicle having long range capability.

Background Of The Invention

10 Various remote control systems for motor
vehicles are known and are widely used, especially in
the area of security. Remote control keyless entry
systems are typically a pocket-sized fob with one or
more pushbuttons that send encoded RF signals to a
15 vehicle-installed receiver and perform various
functions such as locking and unlocking doors, locking
and unlocking the trunk, activating and de-activating
an alarm, turning lights on and off, and even starting
the vehicle.

20 The key fob can be used within a fixed
vicinity of the vehicle. The fob has a typical range
of 10-20 meters from the vehicle. Special antennas
and receivers can extend this to a practical limit of
about 250-350 meters. Therefore, when a user is
25 further away than typically 10-20 meters, the fob is
ineffective.

Current systems that are capable of long
range communications require software, hardware and

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special wiring changes to be made to the vehicle in order for the addition of the long-range system to be recognized by the vehicle. Because the addition of the long-range system is not transparent to the vehicle's existing short-range system, it adds unwanted cost and complexity to the remote control system. For high end luxury vehicle features, it is more cost effective to have one common high volume design that can be easily connected to numerous low volume unique vehicle architectures.

Thus there is a need for a long-range remote control system that does not add unwanted cost and complexity to a remote control system. In addition, the system should be capable of being retro-fit to later model vehicles that were originally produced without remote control, or keyless entry, systems without the need for extensive modifications to the vehicle and its wiring system.

Summary Of The Invention

It is an object of the present invention to provide control of remote keyless entry functions from a substantial distance, on the order of several hundred to several thousand kilometers. It is another object of the present invention to provide a long-range, keyless entry system that can be retrofit to older model vehicles.

It is a further object of the present invention to reduce the cost and complexity of remote keyless entry systems.

In carrying out the above objects and other objects and features of the present invention, a long-

range, remote keyless entry system for a vehicle is provided that has a long-range wireless receiver that receives transmission signals from a wireless transmission source, such as a cellular phone network or satellite network. A wireless signal transmitter is mounted on the vehicle and uses the same protocol as the hand-held wireless transmitter (key fob) to perform various vehicle functions, such as locking/unlocking doors, opening/closing windows and/or the trunk, etc. A gateway device is mounted on the vehicle and controls the short-range transmitter based on instructions the gateway device receives from the long-range receiver.

Therefore, in accordance with the present invention, a user can send a transmission signal, via a cellular phone, to the long-range wireless receiver. The instructions received from the long-range receiver are then communicated to the short-range transmitter by way of the gateway device. In this regard, a long-range system can be easily added to an existing remote keyless entry system (already installed on the vehicle) at a reduced cost. This allows the user to perform various vehicle functions from a substantial distance with a mere phone call or Internet connection to their vehicle.

Other objects and advantages of the present invention will become apparent upon reading the following detailed description and appended claims, and upon reference to the accompanying drawings.

Brief Description Of The Drawings

For a more complete understanding of this invention, reference should now be had to the embodiments illustrated in greater detail in the accompanying drawings and described below by way of examples of the invention. In the drawings:

FIGURE 1 is a block diagram of the remote keyless entry system according to the present invention; and

FIGURE 2 is a block diagram of the gateway device of the system of the present invention.

Detailed Description Of Preferred Embodiments

Figure 1 is a block diagram of a vehicle 1 having the remote keyless entry system 10 of the present invention. The vehicle 1 is equipped with a short-range wireless receiver 12 that is capable of receiving normal short-range signals from a wireless handheld transmitter 14 that is typically carried by the user, such as a key fob. The range of the handheld transmitter 14 is typically 10-20 meters and controls several functions that include, but are not limited to, lock, unlock, trunk control, panic alarm activation and deactivation, and remote start. Other functions too numerous to mention herein are also capable of being controlled by the remote system and one skilled in the art is aware of the nearly limitless possibilities.

The short-range receiver 12 is typically hard wired to each function that it is designed to control. For example, in Figure 1, the short-range

receiver 12 is hard wired to the door locks 16, the trunk lock, 18 and the vehicles horn 20.

The handheld transmitter 14 is typically and RF transmitter that is capable of broadcasting at 315
5 MHz with a predefined protocol 15. The broadcast signals are typically coded or encrypted in order to identify the broadcast signal with the particular vehicle and particular vehicle function being controlled. The broadcast signals are transmitted to
10 the short-range receiver 12, where the commands are executed. Up to this point, this is typical of a remote keyless entry system already known in the art.

The present invention provides a novel approach to long-range remote keyless entry in a
15 simple, yet effective, system that can be easily implemented on new and old vehicles without significant modifications to the vehicle's existing wiring system. A gateway device 22 is used to send instructions to the short-range receiver based on
20 commands received from a long-range transmitter 24. The gateway device 22 provides communication between the short-range and long-range communication protocols and allows control commands to be relayed to the vehicle from distant locations.

25 The gateway device 22 of the present invention is further described in conjunction with Figure 2. The device 22 is installed on the vehicle and has a long-range receiver 26. The long-range receiver 24 is capable of receiving a coded or
30 encrypted message from a wireless transmission source (not shown in Figure 2, but shown in Figure 1 by reference number 24), such as an Internet connection,

a cellular telephone network or a satellite network. The long-range signal has a predefined protocol 25 that is different from the predefined protocol 15 used in conjunction with the short-range receiver (not
5 shown in Figure 2).

The long-range receiver 26 communicates the signal to a second wireless transmitter 26 that is also mounted on the vehicle (not shown in Figure 2). The second wireless transmitter 28 uses the same
10 predefined protocol 15 as the handheld transmitter (not shown in Figure 2) to communicate the commands to the short-range receiver 12. This feature eliminates the need for hardwired connections between the long-range transmitter and the devices 16, 18, 20 on the
15 vehicle being controlled by the long-range receiver 26. There are no additional wiring connections to maintain, thereby reducing the cost and complexity of installation, maintenance and trouble-shooting the system of the present invention.

20 This offers a significant cost advantage on large-scale applications where production volumes are low on any one vehicle and each vehicle has unique electrical interface and packaging requirements. By using the vehicle's existing short-range RF receiver
25 as the communication entry port, this invention allows one simple device produced at high volumes to be applied to numerous electrically unique vehicles produced at low volumes, i.e. luxury vehicles.

The system of the present invention
30 increases range of remote control from the prior art range of tens of meters to a range that is virtually limitless on the order of hundreds and thousands of

What Is Claimed Is:

1. A remote command system for a vehicle comprising:

a portable handheld short-range transmitter;

5 a short-range wireless receiver mounted on the vehicle, said short-range wireless receiver being capable of receiving a coded signal having a first predefined protocol from said portable handheld short-range transmitter, said coded signal containing a
10 command to operate a predefined vehicle function, said short-range wireless receiver sends commands that operate predefined vehicle functions;

a long-range wireless communication system for sending a coded signal having a second predefined
15 protocol that is different from said first predefined protocol; and

a gateway device mounted on said vehicle whereby said gateway device receives said coded signal from said long-range wireless communication device,
20 translates said coded signal to said first predefined protocol and communicates said translated signal to said short-range receiver.

2. The system as claimed in claim 1 wherein said gateway device further comprises:

25 a long-range receiver that is capable of receiving said coded signal from said long-range wireless communication device; and

a wireless signal transmitter located on the vehicle for transmitting a command to said short-range
30 receiver using said first predefined protocol.

3. The system as claimed in claim 2 wherein said wireless signal transmitter is a RF transmitter.

4. The system as claimed in claim 1 wherein said long-range wireless communication system is a cellular system.

5. The system as claimed in claim 1 wherein said long-range wireless communication system is a satellite system.

6. The device as claimed in claim 1 wherein said long-range wireless communication is a digital broadcast system.

7. The device as claimed in claim 1 wherein said long-range wireless communication system is an Internet connection.

8. The system as claimed in claim 1 wherein said long-range wireless communication system is a phone connection.

9. The system as claimed in claim 1 wherein said long-range wireless communication system is a pager system.

10. A method for long-range remote control of predetermined vehicle functions on a vehicle having a short-range receiver and a gateway device, said method comprising the steps of:

receiving a long-range command from a wireless transmission source, said long-range command having a first predefined protocol;

translating said long-range command into a second predefined protocol;

transmitting said translated long-range command to a short-range wireless receiver;

5 operating the predefined vehicle function that corresponds to said translated long-range command.

11. The method as claimed in claim 10 wherein said step of receiving a long-range command
10 further comprises receiving said long-range command by a long-range receiver; and

 said step of transmitting said translated long-range command to a short-range wireless receiver further comprises transmitting said translated long-
15 range command by a wireless transmitter located on said vehicle.

12. The method as claimed in claim 10 wherein said step of receiving a long-range command further comprises receiving a long-range command from
20 a cellular system.

13. The method as claimed in claim 10 wherein said step of receiving a long-range command further comprises receiving a long-range command from a satellite system.

25 14. The method as claimed in claim 10 wherein said step of receiving a long-range command further comprises receiving a long-range command from a digital broadcast system.

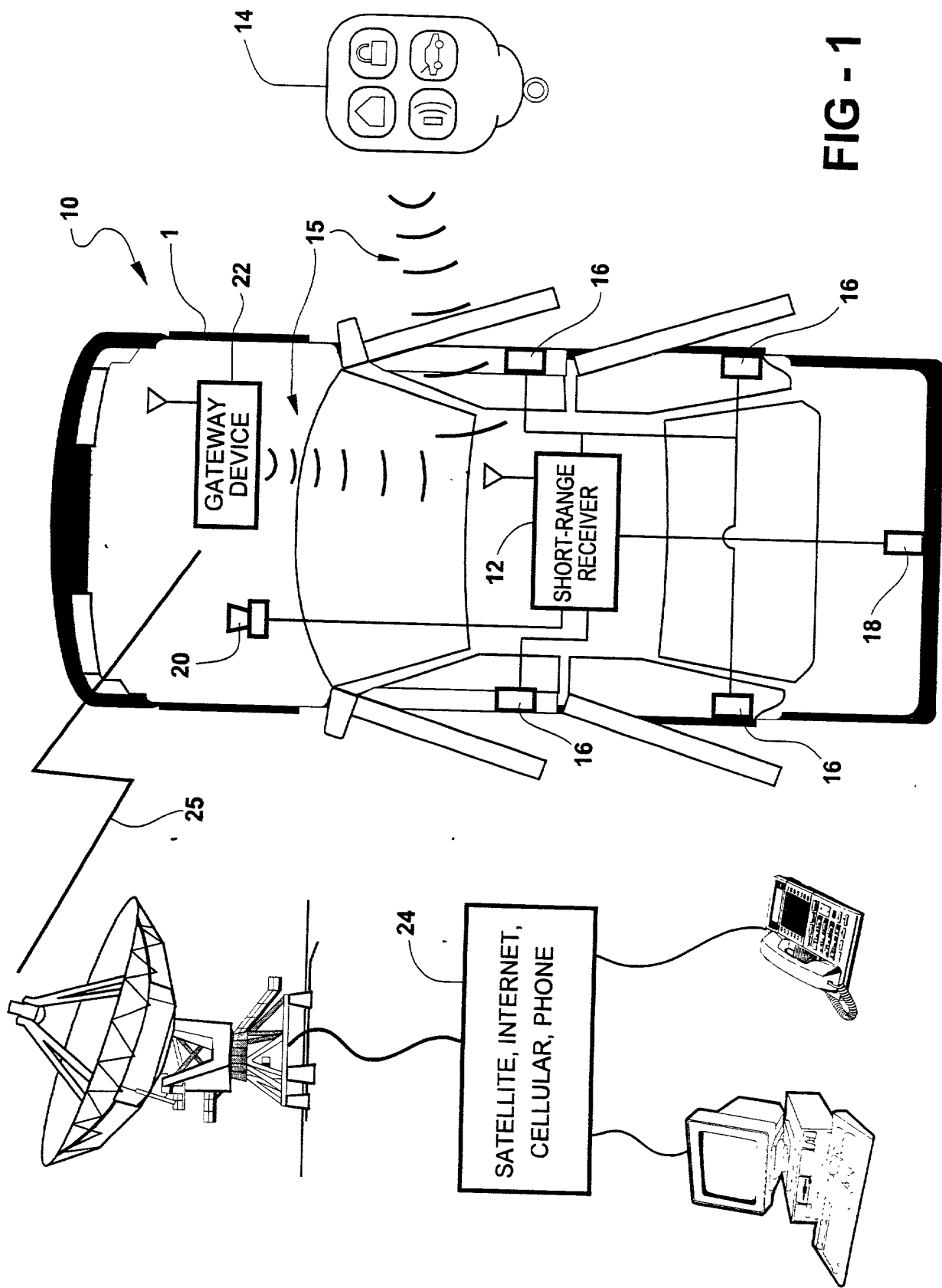
15. The method as claimed in claim 10 wherein said step of receiving a long-range command further comprises receiving a long-range command from an Internet connection.

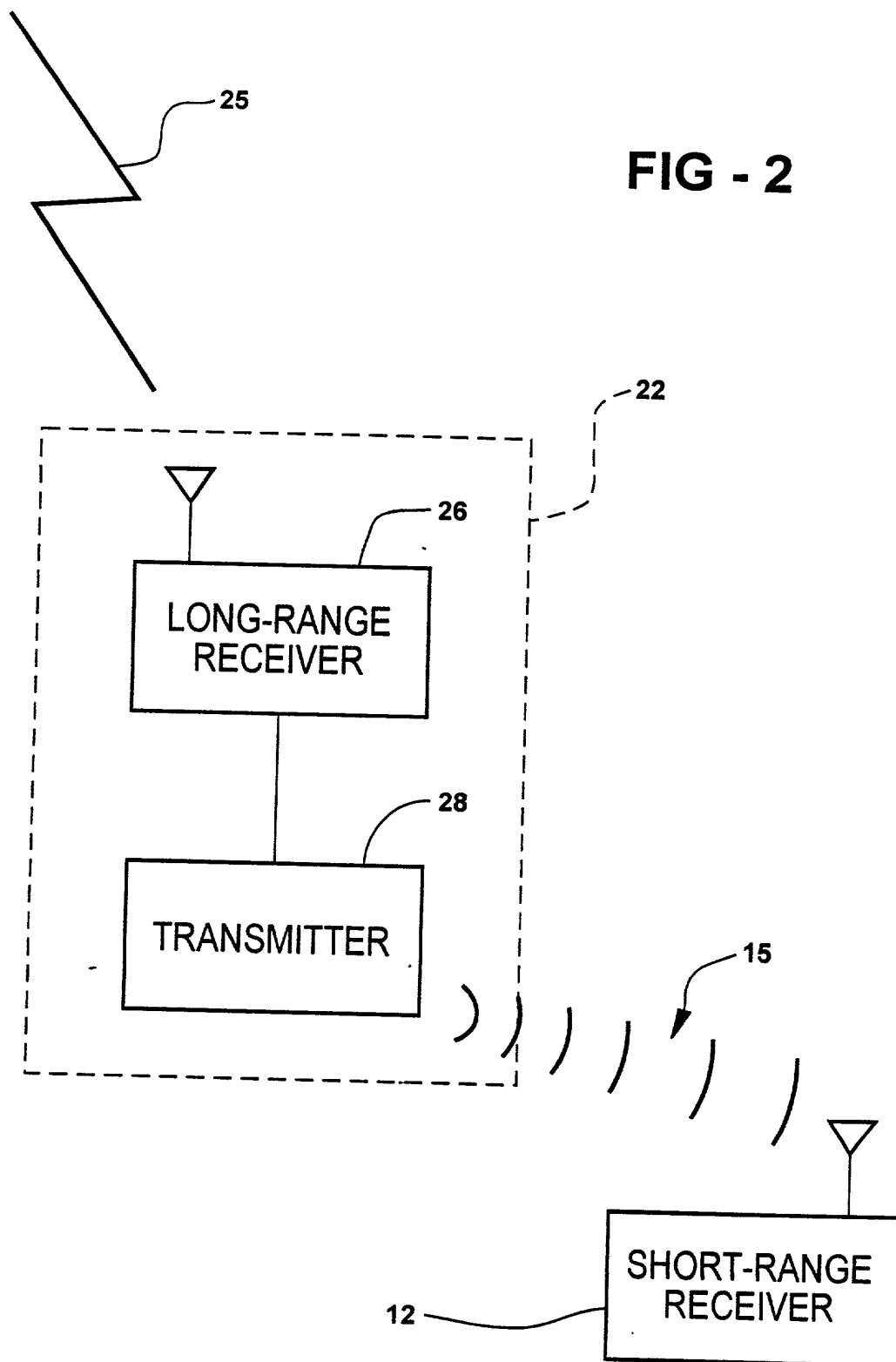
5 16. The method as claimed in claim 10 wherein said step of receiving a long-range command further comprises receiving a long-range command from a phone connection.

10 17. The method as claimed in claim 10 wherein said step of receiving a long-range command further comprises receiving a long-range command from a pager system.

Abstract

A system (10) for long-range, remote keyless control of predefined functions for a vehicle (1) is provided that has a long-range wireless receiver (22) that receives transmission signals (25) from a wireless transmission source (24), such as a cellular phone network or satellite network. A wireless signal transmitter (22) is mounted on the vehicle (1) and uses the same protocol (15) as a hand-held wireless transmitter (12) to perform various vehicle functions, such as locking/unlocking doors (16), opening/closing windows and/or the trunk (18). The advantage being the low cost addition of the long-range control using the vehicle's existing short-range RF receiver and electrical infrastructure.





DECLARATION AND POWER OF ATTORNEY - ORIGINAL APPLICATION**Attorney's Docket No.**
200-0289

As a below named inventor, I hereby declare:

My residence, post office address and citizenship are as stated below next to my name;

I verily believe I am the original, first and sole inventor or an original, first and joint inventor of the subject matter that is claimed and for which a patent is sought on the invention entitled

REMOTE CONTROL SYSTEM FOR OPERATING SELECTED FUNCTIONS OF A VEHICLE

the specification of which is attached hereto.

I have reviewed and understand the contents of the specification identified above, including the claims.

I acknowledge my duty to disclose information of which I am aware that is material to the examination of this application in accordance with Section 1.56(a), Title 37 of the Code of Federal Regulations; and as to application for patents or inventor's certificate on the invention filed in any country foreign to the United States of America, prior to this application by me or my legal representatives or assigns,

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☐ I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

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I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s) or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

(Application Number)	(Filing Date)	(Status - patented, pending, abandoned)
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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the United States Patent and Trademark Office connected therewith and to act on my behalf before the competent International Authorities in connection with any and all international applications filed by me.

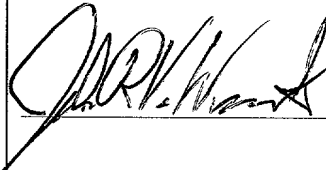

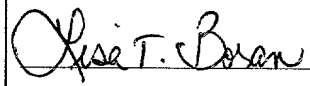
(List name and registration number)

Angela M. Brunetti - 41,647**John A. Artz - 25,824****Jennifer M. Stec - 35,379****Mark S Sparschu - 38,317****Roger L. May - 26,406**

Address all correspondence and telephone calls to:

Angela M. Brunetti
Artz & Artz PLC
28333 Telegraph Road, Suite 250
Southfield, MI 48034 Phone: 248 223-9500

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

NAME AND POST OFFICE ADDRESS OF INVENTOR:	RESIDENCE	CITIZENSHIP	SIGNATURE	DATE
John Robert Van Wiemeersch 45500 Addington Lane Novi, MI 48374 US	Novi, MI 48374 US	U.S.A		11/13/00
David Anthony Symanow 46028 Rockledge Plymouth, Michigan 48170 US	Plymouth, Michigan 48170 US	U.S.A		11/10/00
Lisa Therese Boran 49832 Norwich Livonia, MI 48152 US	Livonia, MI 48152 US	U.S.A		11/13/00
Mark Edward Porter 1837 N. Highland Dearborn, MI 48128 US	Dearborn, MI 48128 US	U.S.A		

Address all correspondence and telephone calls to:

Angela M. Brunetti
Artz & Artz PLC
28333 Telegraph Road, Suite 250
Southfield, MI 48034 Phone: 248 223-9500

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

NAME AND POST OFFICE ADDRESS OF INVENTOR:	RESIDENCE	CITIZENSHIP	SIGNATURE	DATE
John Robert Van Wiemeersch 45500 Addington Lane Novi, MI 48374 US	Novi, MI 48374 US	U.S.A		
David Anthony Symanow 46028 Rockledge Plymouth, Michigan 48170 US	Plymouth, Michigan 48170 US	U.S.A		
Lisa Therese Boran 19832 Norwich Livonia, MI 48152 US	Livonia, MI 48152 US	U.S.A		
Mark Edward Porter 1837 N. Highland Dearborn, MI 48128 US	Dearborn, MI 48128 US	U.S.A	<i>Mark E. Porter</i>	13 Nov 2000